

Claims:

1. A soil stabilizer for treating a ground surface, the stabilizer comprising:
  - a stabilizer frame;
  - 5      • a rotor rotatably mounted with respect to the stabilizer frame, the rotor movable with respect to the ground surface such that the rotor may engage various depths of earth to cut and remove the earth;
  - a rotatable axle for providing movement of the soil stabilizer to move the stabilizer frame and rotor across the ground surface, the axle connected
  - 10      with respect to the stabilizer frame; and
  - a track apparatus mounted on the rotatable axle, the track apparatus supporting the stabilizer frame and providing for movement of the stabilizer frame and rotor across the ground surface; the track apparatus including:
    - a continuous flexible track having an upper length and a ground-
    - 15      engaging lower length and including an inner surface;
    - an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of the axle; and
    - 20      • an apparatus frame for mounting the axle wheel.
2. The soil stabilizer of claim 1 further comprising a wherein the rotatable axle is powered.

3. The soil stabilizer of claim 1 wherein the rotatable axle is a front rotatable axle and the track apparatus is a front track apparatus and further comprising:

- a rear rotatable axle connected with respect to the stabilizer frame,
- a rear track apparatus mounted on the rear rotatable axle, the rear track apparatus supporting the stabilizer frame and providing for movement of the stabilizer frame and rotor across the ground surface; the rear track apparatus including:
  - a continuous flexible track having an upper length and a ground-engaging lower length and including an inner surface;
  - an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of the axle; and
  - an apparatus frame for mounting the axle wheel.

4. The soil stabilizer of claim 1 further comprising a mixing chamber, the rotor pulling soil into the chamber where the soil is treated.

5. The soil stabilizer of claim 4 wherein the mixing chamber includes a rear exit through which soil passes after the soil is treated.

6. The soil stabilizer of claim 5 wherein the mixing chamber includes a bottom surface which engages the ground surface, the rotor passing through the bottom surface when the rotor is lowered into contact with the earth.

7. The soil stabilizer of claim 1 wherein the rotatable axle includes two axially aligned rotatable axles and the track apparatus includes two track apparatus, each track apparatus mounted on a respective rotatable axle, each track apparatus including:

- 5           • a continuous flexible track having an upper length and a ground-engaging lower length and including an inner surface;
- an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of the axle; and
- 10          • an apparatus frame for mounting the axle wheel.

8. The soil stabilizer of claim 7 wherein the rotatable axles are front rotatable axles and the pair of track apparatus are front track apparatus and further comprising:

- 15          • a rear rotatable axle connected with respect to the stabilizer frame,
- a rear track apparatus mounted on the rear rotatable axle, the rear track apparatus supporting the stabilizer frame and providing for movement of the stabilizer frame and rotor across the ground surface; the rear track apparatus including:
  - 20           • a continuous flexible track having an upper length and a ground-engaging lower length and including an inner surface;
  - an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of the axle; and
  - 25           • an apparatus frame for mounting the axle wheel.

9. The soil stabilizer of claim 8 wherein the rear rotatable axle includes two axially aligned rear rotatable axles and the rear track apparatus includes two rear track apparatus, each rear track apparatus mounted on a respective rear rotatable axle, each rear track apparatus including:

- 5           • a continuous flexible track having an upper length and a ground-engaging lower length and including an inner surface;
- an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of
- 10          the axle; and
- an apparatus frame for mounting the axle wheel.

10. The soil stabilizer of claim 6 wherein the front and rear rotatable axles are powered.

11. The soil stabilizer of claim 1 wherein the track apparatus further includes a plurality of wheels engaging the inner surface of the track, including leading and trailing idler wheels, and at least one bogie wheel engaging only a middle portion of the lower length of the track, and wherein:

- 20           • the apparatus frame is of a uni-body construction such that it includes fixed-mounts in fixed relative positions, each fixed-mount defining an axis;
- the axle wheel is rotatably mounted to one of the fixed-mounts and turns on the respective fixed-mount axis;
- one of the idler wheels is rotatably mounted to one of the fixed-mounts and
- 25          turns on the respective fixed-mount axis,
- the at least one bogie wheel is rotatably mounted to one of the fixed-mounts and turns on the respective fixed-mount axis, and
- an idler-mounting bracket is pivotably mounted to another of the fixed-mounts and pivots on the respective fixed-mount axis, the bracket having
- 30          an idler-mount defining an idler-mount axis at which the other idler wheel is rotatably mounted in variable positions with respect to the apparatus frame.

12. The soil stabilizer of claim 11 wherein the apparatus frame defines a lateral recess receiving the axle wheel.
13. The soil stabilizer of claim 11 wherein the apparatus frame includes a  
5 spindle hub for rotatably receiving the rotatable axle.
14. The soil stabilizer of claim 11 wherein the fixed-mounts comprise apertures for receiving axles therethrough.
- 10 15. The soil stabilizer of claim 11 wherein the trailing idler wheel is rotatably mounted to one of the fixed-mounts and the leading idler wheel is rotatably mounted to the idler-mount.
- 15 16. The soil stabilizer of claim 11 wherein the trailing idler wheel comprises a pair of axially-aligned wheels and the leading idler wheel comprises a pair of axially-aligned wheels.
- 20 17. The soil stabilizer of claim 11 wherein the track apparatus further comprises a leading idler assembly attached to the apparatus frame at one of the fixed mounts, the leading idler assembly including the leading idler wheel engaging the flexible track.

18. The soil stabilizer of claim 1 wherein the track apparatus further comprises:

- an idler assembly having an idler wheel engaging the track, the idler assembly being moveable with respect to the apparatus frame;
- 5     • a tensioning device for maintaining tension on the continuous flexible track, the tensioning device comprising:
  - a main-cylinder housing interconnected to one of the apparatus frame and the idler assembly, the housing extending along an axis and defining a main chamber therein;
  - 10     • a main piston having a first end operatively connected to the other of the apparatus frame and the idler assembly and a second end slidably received within the chamber, the piston movable between a retracted position and an extended position;
  - 15     • a primary dampening structure for resisting movement of the piston toward the retracted position for a first predetermined axial length; and
  - 20     • a secondary dampening structure for resisting movement of the piston toward the retracted position for a further axial length beyond the first predetermined axial length, the secondary dampening structure resisting movement of the piston independent of the primary dampening structure.

19. The soil stabilizer of claim 18 wherein the primary dampening structure includes:

- a primary cylinder extending along an axis and defining a primary chamber therein; and
- 25     • a primary piston slidably received in the primary cylinder and movable axially between a first and second position, the primary piston dividing the primary chamber into a first portion for receiving a pressurized gas and a second portion.

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20. The soil stabilizer of claim 19 wherein the secondary dampening structure includes:

- a secondary cylinder extending along an axis and defining a secondary chamber therein; and
- 5       • a secondary piston slidably received in the secondary cylinder and movable axially between a first and second position, the secondary piston dividing the secondary chamber into a first portion for receiving a pressurized gas and a second portion; whereby the conduit interconnects the main chamber and the second portion of the secondary chamber and wherein the hydraulic  
10       fluid is disposed within the second portion of the secondary chamber.

21. The soil stabilizer of claim 20 wherein the pressure of the pressurized gas in the first portion of the secondary chamber is greater than the pressure of the pressurized gas in the first portion of the primary chamber.

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22. The soil stabilizer of claim 21 wherein the primary and secondary dampening structures operate to progressively increase resistance to movement of the idler wheel toward the deflected position as the idler wheel moves toward the deflected position.

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23. The soil stabilizer of claim 1 wherein the flexible track includes spaced lugs projecting from the inner surface, each lug terminating in a distal surface spaced inwardly from the main inner surface, and wherein the axle wheel comprises:

- a central hub portion mountable on the axle for rotational movement  
25       therewith;
- a radially-extending portion terminating in a circumferential edge; and
- a peripheral portion affixed to the circumferential edge and having outwardly-facing lug-engagement surfaces positioned for engagement with the distal surfaces of the track lugs.

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24. The soil stabilizer of claim 23 wherein the peripheral portion includes an outer rim forming the outwardly-facing lug-engaging surfaces.

25. The soil stabilizer of claim 24 wherein the outer rim includes a plurality of spaced openings therein.

5 26. The soil stabilizer of claim 23 wherein the peripheral portion includes peripherally-spaced cross-members affixed to the circumferential edge and forming the outwardly-facing lug-engaging surfaces.

10 27. The soil stabilizer of claim 23 wherein the axle wheel is substantially free of side structure in positions laterally adjacent to the lug-engagement surfaces and radially beyond the circumferential edge, whereby the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.

15 28. The soil stabilizer of claim 23 wherein the outwardly-facing lug-engagement surfaces are substantially planar.

20 29. The soil stabilizer of claim 23 wherein:

- the peripheral portion affixed to the circumferential edge has radially-projecting drive members defining lug-receiving gaps therebetween,
- the outwardly-facing lug-engagement surfaces are within the lug-receiving gaps in position for engagement with the distal surfaces of the track lugs, and
- the axle wheel is substantially free of side structure in positions which are laterally adjacent to the lug-engagement surfaces between adjacent pairs of the drive members and radially beyond the circumferential edge, whereby

25 the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.

30 30. The soil stabilizer of claim 23 wherein the peripheral portion includes a plurality of spaced openings for allowing debris to pass through the peripheral portion.



31. The soil stabilizer of claim 23 wherein the outwardly-facing lug-engagement surfaces are substantially convex.

5           32. The soil stabilizer of claim 31 wherein each lug-engagement surface extends in an axial direction parallel to the drive axis such that each lug-engagement surface is a portion of a cylinder.

10           33. The soil stabilizer of claim 31 wherein the axle wheel is substantially free of side structure in positions which are laterally adjacent to the lug-engagement surfaces between adjacent pairs of the drive members and radially beyond the circumferential edge, whereby the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.